

## PENETRATING BULLET WOUND OF ABDOMEN PASSING THROUGH THE SPLEEN, STOMACH, VERTEBRA, AND SPINAL CORD.<sup>1</sup>

LAPAROTOMY AND SUTURE OF STOMACH WOUNDS; RECOVERY. SUBSE-  
QUENT LAMINECTOMY AND REMOVAL OF BULLET FROM  
SPINAL CORD; RECOVERY.

BY JOHN C. PEGRAM, JR., M.D.,

OF PROVIDENCE, RHODE ISLAND,

Surgeon to the Rhode Island Hospital.

ON July 11, 1904, at 7.45 A.M., Mrs. J. A., twenty years of age, was shot at close range with a .32-caliber revolver, while walking on the street. The bullet entered the left side of the body at the level of the eighth rib. She was immediately taken to the Rhode Island Hospital by the ambulance in a state of collapse. On admission physical examination showed a well-developed and fairly well nourished young woman. The skin and mucous membranes were very pale. The pupils equal and slightly dilated. The heart and lungs were examined hurriedly and found negative. The wound of entrance made by the bullet was found on the left side of the trunk over the eighth rib, in the anterior axillary line, surrounded by an area of burnt and discolored skin roughly three inches in diameter. The abdomen was tender on palpation. There was no dulness in the flanks, but marked rigidity of the abdominal muscles. There was complete motor paralysis of both lower extremities, though the patient could move both thighs a trifle, probably owing to the ability to use the psoas muscle. Both lower extremities were hyperæsthetic; even the weight of the bed-clothing being painful, with the exception of an area on the left leg supplied by the fourth lumbar nerve, which was anæsthetic. The pulse was rapid and of poor volume and tension. The bladder was catheterized and normal urine obtained. The patient was taken to the operating room for operation, which was begun at 9.30 A.M. A vertical incision through the abdominal wall, roughly six inches in length, along the outer border of the

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<sup>1</sup> Read before the Rhode Island Medical Society, March 2, 1905.

left rectus, was made. This wound was later enlarged by a second incision from about its centre running outward and downward and to the left for a distance of about three inches. The muscles of the abdominal wall were separated in the direction of their fibres. The abdominal cavity was full of fresh and clotted blood. The bullet was found to have passed through the lower border of the spleen, the mesocolon, cutting a branch of the splenic artery,

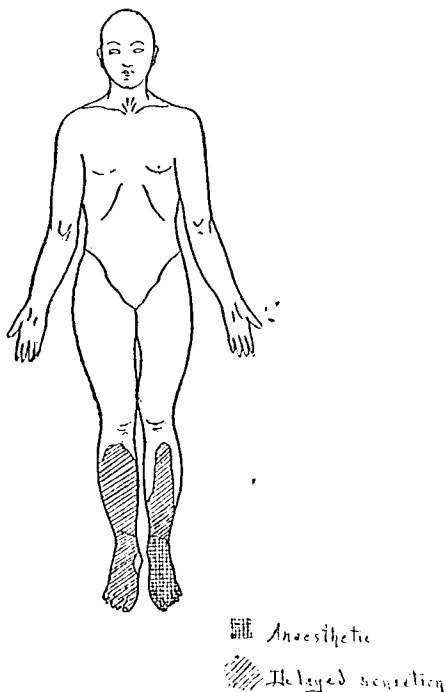
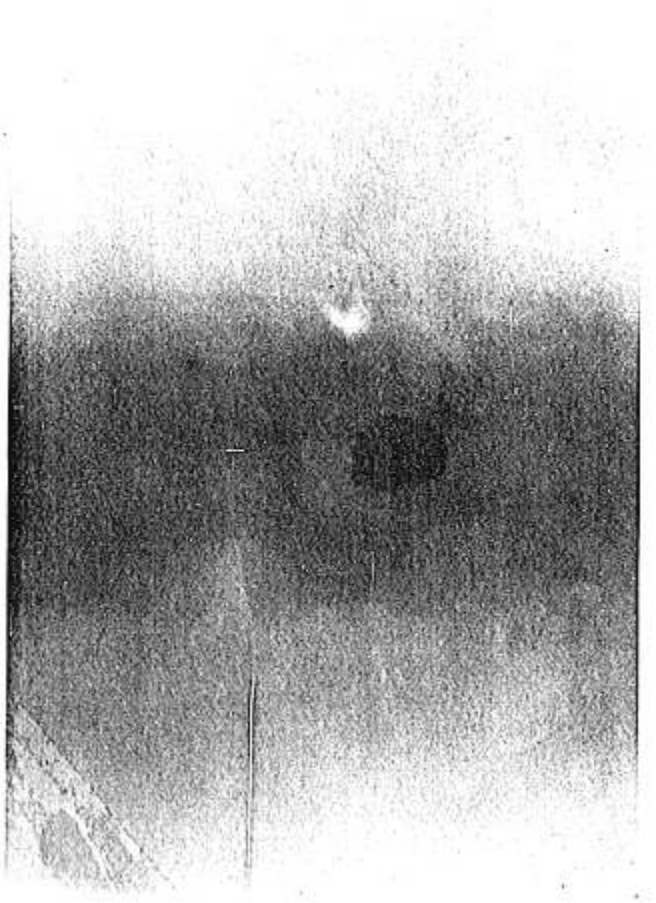


FIG. 2.—Areas of abnormal sensation, February 8, 1905.

from which the hæmorrhage had come, and which was still bleeding freely; in and out of the posterior surface of the greater curvature of the stomach, but no opening in the vertebra could be felt. No great amount of stomach contents was found in the abdominal cavity. The bleeding vessel in the mesocolon was tied with catgut. The openings in the stomach wall were closed with

FIG. 1.—Skiasograph showing relation of bullet to first lumbar vertebra.



a purse-string suture, over which were placed Lembert sutures of black silk. The spleen was not bleeding, and the wound in it was left alone. The abdominal cavity was flushed out with saline solution and a good-sized iodoform gauze drain left in leading to the rupture in the stomach wall. The bleeding was apparently controlled by ligation of the bleeding artery in the mesocolon. The abdominal wall was closed in layers with black silk. The patient stood the operation well, and was given 1200 cubic centimetres of saline intravenously during the operation. She made a good recovery from the ether. Pulse was rapid but fairly good throughout the night. She had considerable paroxysmal pains in the knees during the night, requiring one-sixth grain of morphia subcutaneously. The day following the operation the anæsthesia on the left leg had disappeared.

The second day she complained of numbness in the legs and was able to move the toes. She was very thirsty, and was allowed one drachm of water every hour.

On the fourth day she was allowed one-half ounce of milk every hour.

On the fifth day involuntary micturition appeared for the first time.

On the sixth day a small bed-sore appeared over the sacral area, and she had involuntary bowel movements.

On the seventh day the wick was removed from the abdominal wound, and considerable pus escaped from behind it. Patient again complained of pain in the legs and also in the bladder region, which seemed to be relieved by frequent catheterization.

On the ninth day a soft egg on toast was added to the diet. There was a moderate amount of pus from the wound. Leucocyte count showed 16,400.

On the tenth day an X-ray was taken, being an anteroposterior view of the body. This showed a bullet in the line with the body of the first lumbar vertebra pointing up. Leucocyte count 17,680. Ability to move the legs was increasing, but the patient did not move the left as well as the right.

On the sixteenth day a second X-ray was taken, the light being thrown from the side at a definite angle. This showed a bullet apparently lying in the spinal canal. The pain in the legs extreme. Leucocyte count, 16,200.

On July 30, or nineteen days after the shooting, a laminectomy was performed with the hopes that the removal of the bullet might be followed by relief of her distressing pains, and to a certain extent her paralysis. The patient was placed face downward on the table. An incision about five inches long was made in the median line, between the eleventh dorsal and the fourth lumbar vertebræ. The muscles and fascia were dissected away from the spinous processes and laminae of the vertebræ on either side. Bleeding was controlled chiefly by packing each side of the spinous processes with gauze for a couple of minutes. With the idea in view of trying to save the long spinous ligament in order not to weaken the back too much, the following operation was planned and carried out. First the spinous processes of the twelfth dorsal and first and second lumbar vertebræ were split longitudinally, with a thin-bladed saw, down to the laminae. The supra- and interspinous ligaments were then split longitudinally with a knife, this division making a straight line with the division of the spinous processes. Next the spinous processes were severed from the laminae with a heavy wire cutter shaped like a blacksmith's tongs. In order now to get at the laminae and still preserve the ligament so that it could be replaced, I severed each half of the split ligament at opposite ends after the manner of tendon lengthening. These two halves of the ligament, including the halves of three spinous processes, were then turned out on either side and the spinal canal opened in the usual manner. (Fig. 4.) The bullet lay under the lamina of the twelfth dorsal vertebra in the right posterior quadrant of the spinal cord, which latter must have been traversed by the projectile and was considerably lacerated. The bullet was easily seen and removed without further disturbing the cord. A drain of plain gauze was led down to the rent in the meninges, which I made no attempt to close. The two halves of the supraspinous ligament were reapproximated and sutured with black silk, restoring its continuity. The muscle and skin incisions were closed with black silk sutures, leaving a small opening for the drain. The patient stood the operation as well as could be expected. She was put to bed on a Bradford frame face downward. She made a good recovery from ether.

On the second day after the laminectomy voluntary control of the *tibiales antici* was noted to be present, but weak. She moved the right quadriceps and adductors. The same held true of the

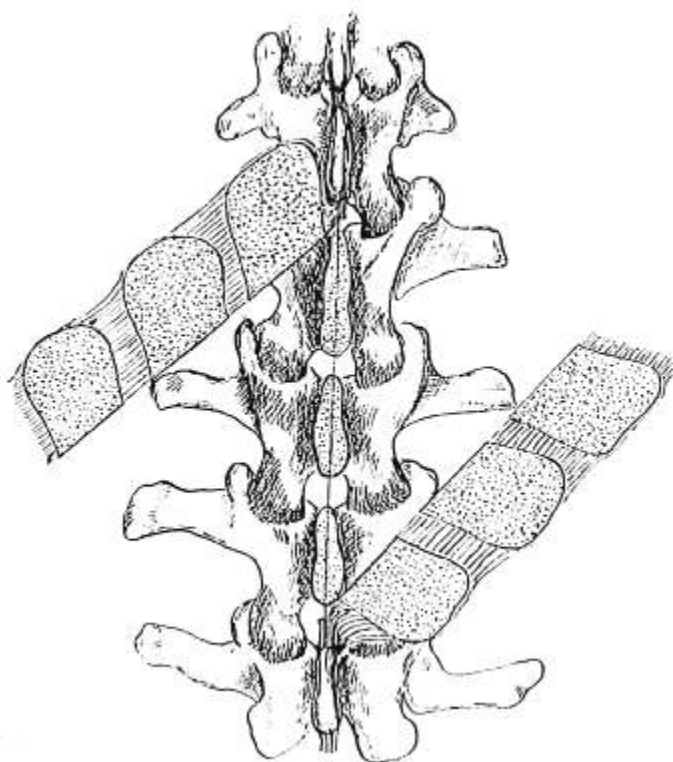
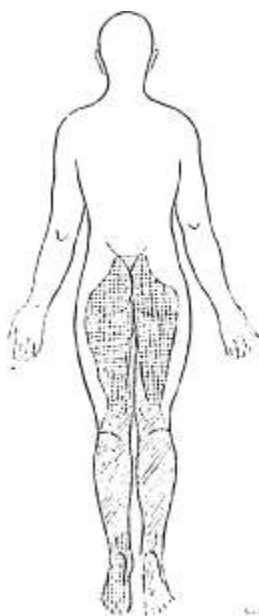


FIG. 1.--Showing method of splitting spinous processes, the supra- and interspinous ligaments, before cutting away the laminae.

left side, except that the impulse was weaker and the quadriceps extensor did not respond.

On the third day she complained of itching of the skin of the abdomen and legs and pain in the left knee.

On the sixth day the sutures were removed from the back and she was turned onto her back, as she could not bear the stomach position.



Anesthesia

Hyperaesthesia

FIG. 3.—Areas of abnormal sensation, February 8, 1905.

On August 18, or thirty-eight days after she was shot, the abdominal wound was entirely healed, but there still persisted a small sinus in the incision in the back. On this day she was sent out of doors in a go-cart on a Bradford frame.

On August 22, or the twenty-third day after the laminectomy, a plaster jacket was applied, and the patient was able to go out of doors in a wheel-chair for three hours. She was much more comfortable with the jacket on.

On August 31, having been out of doors daily since the jacket was applied, she was allowed to go home in the ambulance. She was at this time running a little temperature, but the pain in the legs was the symptom most complained of.

The history since leaving the hospital has been one of gradual convalescence. For the first six weeks after returning home the patient suffered much pain periodically in her knees and legs, with occasional and sometimes frequent pains in her bladder. The bed-sore over the sacrum was very resistant, but finally healed towards the latter part of November. The plaster jacket was removed after it had been on three weeks because the continual dribbling of urine soaked into the plaster and made it offensive. There has been no complaint of any pain in the back at the site of the laminectomy wound, which healed per primam, except for a slight sinus caused by the wick to the spinal cord, which persisted for a number of days and then closed. Since the middle of October, when the patient made a marked change for the better, convalescence has been rapid. She gained in weight and in ability to move her previously paralyzed muscles, and there has been a gradual subsidence of pain in both legs and bladder. There was noticed at this time also an ability to hold her water for several minutes at a time, but when the desire came the urine was passed before she could dispose of it properly. She was up in a wheelchair daily. By the 1st of November she took a few steps each day with a member of her family on each side to support her, and by the 1st of December she was able to get about on crutches.

On December 18 she took a few steps alone without any support. At the present time she can walk alone, though her muscle power is still too weak for very much exertion. She may be said at this time to have regained almost complete control over her vesical sphincter, though at times this is apt to demand hurried attention. The bowels move, though they usually require enemata.

February 8, 1905, Dr. George L. Shattuck kindly tested the skin sensation of both lower extremities. He found a more or less saddle-shaped area of anæsthesia to tactile and temperature sense. This was quite symmetrical, starting on the sacrum behind and curving outward towards the trochanters, and then turning downward and involving the posterior surface of the thighs as far as the upper border of the popliteal spaces. This

area of anæsthesia then involved the inner part of the thighs, including the labiæ. The whole surface of the left foot, including the ankle, and a narrow strip on the right sole were anæsthetic. Everywhere else on both extremities, with the exception of the anterior surface of both thighs as low as the tibial tubercles, sensation was delayed though present. All muscles of both lower extremities gave the reaction of degeneration. Though sensation was delayed or altogether lost in places and normal in others, there were no sharp lines of demarcation to correspond with the distribution of any one nerve. A transverse myelitis must have been set up by the injury to the cord, caused by the passage through it of the bullet in order to produce the paralysis of the bladder sphincter, noted for the first time on the fifth day after the injury was received. The recovery from this lesion is of necessity a slow one, but if the patient continues to regain her lost functions at the present rate of progress, I believe we may look for a disappearance of almost all motor and sensory disturbances.